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REGIONAL VARIATIONS IN EDUCATIONAL VIEWPOINT

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In any free society, popular opinion inevitably constitutes an important determiner of the role of the school. Public education is always, at least indirectly, responsible to the society that supports it; and, for better or for worse, the values of that society ultimately get reflected in the purposes assumed by the school. Accordingly, it is not surprising that public perception of the school's role has recently become the subject of numerous investigations.

Some such studies (1) have attempted only to appraise the extent of public approval or disapproval of existing educational programs. Others (2) have endeavored to identify the major bases of differences in opinion with respect to education. Still others (3) have sought to discover the significant relationships between the traits of individuals and the educational values they hold.

The investigation to be reported here (4) attempted to identify constellations of public opinion or popular "philosophies" of education, and to discover the extent to which these "philosophies" reflected the values of particular geographic regions in the United States and Canada.

THE TASK OF EDUCATION

Intellectual Dimensions

1. KNOWLEDGE ITSELF ..... (information)
2. COMMUNICATION OF KNOWLEDGE ..... (basic skills)
3. CREATION OF KNOWLEDGE ..... (creativity)
4. DESIRE FOR KNOWLEDGE ..... (curiosity)

Social Dimensions

5. MAN TO FELLOW MAN ..... (social skill)
6. MAN TO STATE ..... (citizenship)
7. MAN TO HIS OWN COUNTRY ..... (patriotism)
8. MAN TO THE WORLD COMMUNITY ..... (world citizenship)

Personal Dimensions

9. PHYSICAL HEALTH ..... (physical)
10. EMOTIONAL WELL BEING ..... (emotional)
11. MORAL STANDARDS ..... (moral)
12. AESTHETIC APPRECIATION ..... (aesthetic)

Productive Dimensions

13. VOCATION-SELECTIVE ..... (guidance)
14. VOCATION-PREPARATIVE ..... (job training)
15. HOME AND FAMILY ..... (handyman)
16. CONSUMER ..... (consumer skill)

Figure 1.—The Task of the School: Conceptual Framework.

Procedures

The major dimensions, or commonly accepted elements of the school's task, were identified through an elaborate synthesis of most notable statements of the purposes of education from the time of Horace Mann to the present.

Sixteen basic elements were thus identified. The elements were refined and ordered into the mutually exclusive items of the task framework summarized in Figure 1.

This conceptual framework provided a basis for the construction of an instrument which permitted respondents to indicate the priority of importance they assigned to the various aspects of the task. *The T.P.E. Opinionnaire* (5) incorporated a simple, card-manipulating, Q-sort design, permitting respondents to make a series of priority choices for both the high school task and the elementary school task.

Approximately 4,000 opinions were gathered, representing four major geographic regions in the United States—namely, the Far West, the Mid-West, the Deep South and the East—and one in Canada—namely the province of Alberta.

Two major types of analysis were conducted: the first involved the calculation of absolute differences among specific item means for the various regions, using the W.S.D. method of multiple comparisons (6). The second involved a UNIVAC factor analysis to identity tendencies of items to cluster and tendencies of respondents to form sub-groups in correspondence with the item clusters.

Findings

General regional differences in educational point of view followed a strikingly regular pattern. The American Midwest assumed what might be termed a middle-of-the-road position; it constituted the pivotal point around which and across which major deviations were found. The West deviated in the direction of more socialization in schools; the South emphasized personal development, particularly physical; the East favored greater attention to moral and vocational training; and Canada, the greatest deviant, placed significantly greater emphasis upon intellectualism, aesthetic appreciation and world citizenship. These broad regional differences are summarized in Figure 2.

It must be emphasized that Figure 2 is a grossly generalized summary of the regional differences. Other generalizations, not clearly indicated in Figure 2, are noteworthy: Intellectualism decreased regularly from East to West and North to South; conversely, emphasis upon socialization increased regularly from East to West

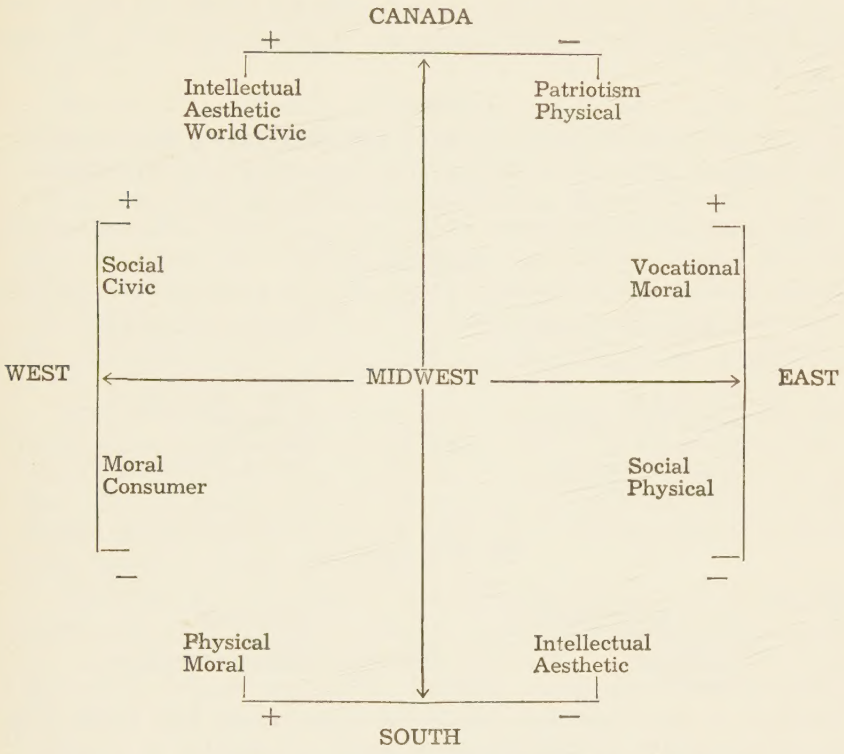

Figure 2.—Regional Differences in Perception of the School's Task.

and North to South. In much the same way, the expectation for moral training in schools decreased from East to West, but through the South, while the emphasis upon civic training decreased from West to East, but through the South. Notably, Canada emphatically disfavored patriotic teaching as a function of the school, but indicated strong support for the development of world citizenship. All significant Canadian-American differences in perceptions of the tasks of the elementary and high schools are summarized in Table I.

In summary it may be noted that Canadians appeared to believe, more emphatically than did Americans, that the public school should serve the individual; Americans believed, on the other hand, that it should serve society. Canadians, as a group, assigned considerably higher priority than did Americans to knowledge, scholarly attitudes, creative skills, aesthetic appreciation and morality, as outcomes of schooling. Americans emphasized physical development, citizenship, patriotism, social skills, and family living much more than did Canadians. The former attitudes may be attributable to a value

orientation emphasizing the perfection of the individual, the latter to a value orientation emphasizing the improvement and well being of society.

TABLE I

SUMMARY OF SIGNIFICANT DIFFERENCES BETWEEN CANADIAN AND AMERICAN PERCEPTIONS OF THE TASK OF THE PUBLIC SCHOOL

Favored by Canadians	Favored by Americans
High School	
Creativity[a]	World Citizenship[a]
Desire for Knowledge[a]	Patriotism[c]
Aesthetic[a]	Physical[a]
World Citizenship[b]	Man to Fellow Man[b]
Consumer[b]	
Elementary School	
Desire for Knowledge[a]	Patriotism[c]
Ethical[b]	Physical[a]
Aesthetic[b]	Home and Family[a]
Consumer[b]	

[a]Educators only. [b]Non-Educators only. [c]Both.

It is interesting to note too that Canadians regarded training in world citizenship to be much more important than did Americans. Canada, as a member of the British Commonwealth, maintains a more formal association with other parts of the world than does the United States. All of the Canadian's "belongingness" is not centered in his own country; this may well explain the fact that he assigned greater importance to world citizenship and less importance to patriotism than did Americans.

The Canadian's high regard for creativity, aesthetic appreciation, knowledge, and the desire for knowledge may, in part, be accounted for in another way. Canada is less industrialized and less developed than the United States. Mass communication media—the easy, popular way to information, culture, and entertainment—are not as much a part of the Canadian's life as they are of the American's. Perhaps Canadians feel that they still have to work for their information, their culture, and their leisure-time entertainment.

As indicated, the factor analysis provided a further measure of regional variations in educational perspective. Three strong factors

emerged, Intellectual *vs* Productive, Vocational *vs* Social-Personal and Social *vs* Personal, but only the first discriminated along regional lines.

Factor 1, Intellectual *vs* Productive included a high positive value for the intellectual, and a somewhat lower positive value for the aesthetic, the emotional and world civic; conversely, it included a high negative value for the productive, and a somewhat lower negative value for the physical, the patriotic and for the civic. Thus, the respondent who ranked highly on this factor strongly favored intellectual pursuits in schools, and added to these aestheticism, world citizenship, and emotional stability; but he strongly disfavored the productive aspects of education and included in his disfavor moral training, citizenship, and physical education.

Who were the respondents with this point of view? The top four groups (approximately 200 respondents) on this factorial continuum were college-trained, Canadian educators under 45 years of age. This indicates rather vividly the dimensions of the fundamental differences between Canadian and American points of view with respect to education purpose!

Canadians typically believe that their educational systems closely parallel those in the United States; in fact, Canadians occasionally are somewhat uncomfortable with this fact. It may be that their discomfort is born of a certain conflict arising out of the fact that Canadian and American educational systems tend to function similarly, in spite of subtle but basic differences in the educational viewpoints of the two countries.

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SEX DIFFERENCES IN SPELLING IN CANADIAN CHILDREN'S FREE WRITING*

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I. THE PROBLEM

The purpose of this study is to determine and to attempt to analyse the spelling errors of Canadian boys and girls as revealed in the free writing of a representative population sample from each of the ten provinces in Canada.

Specifically the following problems are to be considered in this study:

i. Do boys misspell a greater number of words than do girls?

ii. Do boys misspell a higher "quality"** of words than do girls? That is, are the words boys misspell of a more difficult nature because they are less frequently used than the words girls misspell?

iii. Can a demon list be compiled from the free writing of Canadian boys and of Canadian girls?

II. THE METHOD

Sources of Data

The data for this study came from the free writing of 13,368 students from Grades II to VIII in every province in Canada. Letters were sent to educational authorities in each province in Canada asking them to contribute composition samples for a research project in spelling which was to be carried on under the sponsorship of the Alberta Committee of Educational Research. This study was done as a part of a larger study which was to launch research into spelling, vocabularly, and language, utilizing a Canada-wide sample. Urban and rural classrooms were selected by provincial officials following the ratio of, urban—1: rural—1. Once the schools were selected by the provincial officials, the principals and teachers concerned were sent instruction sheets asking them to comply with standard regulations governing the writing† of the compositions by their students.

*The authors are indebted to Drs. E. W. Buxton, G. M. Dunlop and M. D. Jenkinson for their assistance in the development of this research.

We are particularly indebted to Dr. G. M. Dunlop under whose planning and direction the data were gathered.

**The term "quality" is here being used in a rather arbitrary way. This term means that, for the purpose of this study, a word not frequently used can be said to have a higher quality numerically than a word more frequently used.

†It is important to note that approximately half of the compositions were written in the spring of 1957 and the remainder in the spring of 1958.

The result of these letters of request was the forwarding to Edmonton of a varied group of uncorrected compositions from the classrooms selected. The compositions were then marked for spelling errors. The number of spelling errors on each paper was recorded. The errors were then printed in alphabetical order, as made, on tally sheets. These tally sheets were constructed to show boys' and girls' errors and the frequency of each error for each sex in each grade.

Treatment of Data

After the data were organized, a quantitative analysis of the spelling errors was begun. The total number of spelling errors in each grade for both boys and girls was found. The mean error per student for each sex was calculated. A comparison was then made between the mean of the spelling errors made by the boys and the mean of the spelling errors made by the girls in each grade.

The next part of this study was the "qualitative" analysis of the spelling errors made by the boys and a similar "qualitative" analysis of those made by the girls. Each error was given a numerical "qualitative value." This value was based on the Rinsland (1945) study of frequency of word usage in children's vocabularies. Rinsland chose a symbol to indicate the frequency of word usage by elementary school children. Using these symbols, the investigator assigned a value to each of the spelling errors which was called a numerical "qualitative value." After the "qualitative values" were found for the spelling errors made by the boys and the girls in each of the Grades from II to V, a comparison was made of the "qualitative values" given to the boys' errors and to the girls' errors in these grades.

The third part of this study was the selecting of Canadian demons. A comprehensive demon list was constructed from other demon lists. Specifically these were, the Jones (9) list, the Fitzgerald (2) list, and the Gates (6) list, (as found in the Pupils' Own Vocabulary Speller). The spelling errors that recurred consistently from the Canadian children's free writing, were added to this comprehensive demon list. Demons from the other lists that did not occur frequently enough to become Canadian demons were deleted from the comprehensive list. The criterion for selecting each Canadian demon was the misspelling of the word six or more times by either the boys or the girls in each grade. This criterion was chosen because it would select approximately two hundred and fifty demons, which is close to the average number of words found in other common demon lists.

TABLE I

THE NUMBER OF ERRORS BY SEX AND BY GRADE IN GRADES II TO VIII AND THE MEAN ERROR PER STUDENT IN EACH GRADE

Grade	II		III		IV		V		VI		VII		VIII	
Sex	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Total Errors	2,750	2,032	3,392	3,105	4,569	3,254	4,201	3,038	4,135	2,994	4,943	3,456	2,839	2,365
Number of Students	936	900	832	878	973	976	966	1,010	916	914	1,115	1,161	828	963
Means of Errors	2,94	2.26	4.00	3.54	4.70	3.33	4.35	3.01	4.51	3.28	4.43	3.28	3.44	2.59
Differences of Means	0.68		0.46		1.37		1.34		1.23		1.46		0.85	

Note: These differences are significant at the .01 level.

III. FINDINGS

Quantitative Differences

Table I indicates the number of spelling errors made by boys and by girls in each grade from Grades II to VIII, and the mean error per student in each of these grades.

From Table I the following facts become evident:

1. In every grade from Grades II to VIII the girls made fewer errors than did the boys.

2. In each of the seven grades the differences between the mean errors for girls and boys were significant at the .01 level.

Table II shows the spelling errors made by Canadian students from Grades II to VIII in Canada.

These facts become apparent as one examines Table II.

1. In Grades II to VIII the 6,566 boys made 26,766 spelling errors—an average of 4.08 errors per boy.

2. In Grade II to VIII the 6,802 girls made 20,238 spelling errors—an average of 2.99 errors per girl.

3. The difference between the mean error of the girls and the mean errors of the boys is 1.09. This difference is significant at the 0.1 level.

From these findings one can conclude that in free writing Canadian boys misspell a greater number of words than do Canadian girls.

TABLE II

THE NUMBER OF SPELLING ERRORS MADE BY CANADIAN STUDENTS: GRADES II TO VIII

	Boys	Girls	Total
Number of Errors	26,766	20,238	47,004
Number of Students	6,566	6,802	13,368
Mean Error Per Student	4.08	2.99	3.52
xm — xg	1.09		

"Qualitative" Differences

Table III indicates the total number of spelling errors tallied for each Rinsland (13) grouping* for boys and for girls in each grade from Grades II to V. Those errors not found in the Rinsland word list are also recorded in Table III under the column heading "Unregistered Words."

TABLE III

THE DISTRIBUTION OF SPELLING ERRORS BY GRADES AND BY SEX ACCORDING TO THE SYMBOLS BASED ON THE RINSLAND* WORD LIST

Rinsland Groupings	Grade II		Grade III		Grade IV		Grade V	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1a1	597	388	665	666	759	558	731	492
1a2	330	244	317	285	480	356	384	271
1a3	211	156	242	258	233	173	153	156
1a4	173	140	150	142	277	179	166	121
1a5	132	107	130	131	168	102	176	131
1b1	132	103	126	123	220	164	151	97
1b2	130	82	93	90	121	79	121	93
1b3	66	55	88	70	87	98	89	76
1b4	81	49	81	96	107	64	81	56
1b5	62	40	87	67	74	57	69	48
2a	190	183	276	241	358	278	381	273
2b	173	128	189	196	263	186	236	159
3a	89	71	140	112	186	158	210	140
3b	72	51	113	109	139	101	149	102
4a	47	54	88	74	113	79	148	94
4b	0	0	81	82	116	75	109	75
5a	0	0	70	51	70	53	55	54
5b	0	0	35	42	59	40	65	55
6	0	0	58	25	101	52	95	57
7	0	0	0	0	103	60	1	0
Totals	2,476	1,851	3,029	2,861	4,034	2,912	3,570	2,550
Unregistered Words	228	130	292	201	483	303	570	402
Totals	2,704	1,981	3,321	3,062	4,517	3,215	4,140	2,952

*These symbols are found in the Rinsland study, pp. 14-15.

*Rinsland grouped words by hundreds, five hundreds, and thousands according to their frequency of word usage. The first five thousand groups of words were subdivided into two five-hundred groups.

The first thousand group was not only subdivided into two groups of five hundreds but these two groups of five hundreds were in turn subdivided into groups of one hundreds.

These groupings were given symbols. The first part of the symbol, a number, indicates the thousand grouping. The second part of the symbol, the letters 'a' or 'b', indicates the first or second five-hundred group in that thousand grouping. The third part of the symbol a number, indicates the hundred group within the five hundred grouping and is used only in the first thousand group of the most frequently used words in each grade level.

The following facts are shown in Table III:

1. The distribution of spelling errors by sex in each Rinsland group from Grades II to V.

2. The totals of the unregistered errors tallied for each sex in each of the Grades II to V.

The number of errors made by each sex in each Rinsland group found in Table III were then compared by using the Chi-square test of independence. The results of this test are given in Table IV.

TABLE IV

THE RESULTS OF THE CHI-SQUARE TEST WHEN APPLIED TO THE DISTRIBUTION OF SPELLING ERRORS FOUND IN TABLE III

Grade	χ^2	df	P	Significance
II	21.384	14	$P < .10$	No Significant Difference
III	27.138	18	$P < .10$	No Significant Difference
IV	17.840	19	$P > .50$	No Significant Difference
V	19.916	19	$P > .30$	No Significant Difference

A cursory glance at Table IV indicates that in Grades II to V in Canada there is no significant difference between the "quality" of the words boys misspell and the "quality" of the words girls misspell.

CANADIAN SPELLING DEMONS

On the basis of the criteria formerly stated for demons, the following Canadian demon lists were selected for each grade from Grades II to V.

The first list includes all the Canadian demons which were found for all the grades from Grades II to V in Canada and which were also found to be included in the other commonly known demon lists, specifically those of Jones (9), Fitzgerald (2), and Gates (6).

Grade II	Grade III	Grade IV	Grade V
always	again	about	again
and	along	again	an
baby	always	always	and
because	and	am	are
before	aunt	and	aunt
break	because	because	because

Grade II	Grade III	Grade IV	Grade V
brother	before	been	been
came	brother	before	believe
coming	children	boy	break
didn't	clothes	boys	came
dog	colour	brother	coming
don't	came	brought	cousin
every	could	buy	decided
father	couldn't	clothes	down
friend	cousin	coming	enough
friends	decided	could	every
fun	didn't	couldn't	finally
getting	does	course	first
goes	down	cousin	friend
good-by	every	decided	getting
got	finally	didn't	got
have	first	doesn't	guess
heard	friend	down	her
him	friends	finally	here
his	from	first	I'm
hospital	getting	friend	its
house	got	friends	it's
it's	heard	from	knew
know	here	getting	know
likes	him	going	minute
little	his	got	morning
lots	house	half	name
me	its	have	now
much	knew	heard	o'clock
name	know	her	off
		here	
o'clock	laid	him	once
off	likes	hospital	one
on	made	house	our
once	morning	I'm	piece
our	mother	in	pretty
people	my	interesting	quiet
play	name	it	quite
plays	off	its	remember
pretty	on	it's	sincerely
said	once	just	some
saw	our	knew	sometimes
some	party	know	suppose
summer	people	little	surprise
surprise	said	minute	swimming
swimming	sometimes	morning	that's
their	swimming	name	their
then	that's	nice	them
there	their	now	then

Grade II	Grade III	Grade IV	Grade V
they	them	o'clock	there
through	then	off	they
to	there	on	they're
too	they	once	thought
train	thought	one	through
two	through	our	tired
very	to	piece	to
want	too	quite	truly
was	two	really	two
we	uncle	remember	until
went	until	said	usually
were	very	sincerely	was
when	want	some	went
white	was	something	we're
will	wear	studying	were
with	went	suppose	when
would	were	surprise	where
.....	when	swimming	which
.....	where	that's	with
.....	with	their	too
.....	would	them	whole
.....	you	then	write
.....	.....	there	your
.....	.....	they	you're
.....	.....	think	yours
.....	.....	thought	.....
.....	.....	through	.....
.....	.....	to	.....
.....	.....	too	.....
.....	.....	truly	.....
.....	.....	two	.....
.....	.....	until	.....
.....	.....	usually	.....
.....	.....	very	.....
.....	.....	want	.....
.....	.....	went	.....
.....	.....	were	.....
.....	.....	we're	.....
.....	.....	when	.....
.....	.....	where	.....
.....	.....	which	.....
.....	.....	wiener	.....
.....	.....	will	.....
.....	.....	with	.....
.....	.....	you're	.....

This second list includes all the Canadian demons which were found by the investigators and *which are not included in other commonly known demon lists.* This list includes a total of 97 (ninety-seven) Canadian demons *which are new words to demon lists.*

Grade II	Grade III	Grade IV	Grade V
after	animals	animals	back
around	another	another	beautiful
ball	around	at	bicycles
black	back	beautiful	biggest
breakfast	beautiful	breakfast	catch
build	black	build	caught
caught	broke	but	chased
climb	build	by	circus
dollars	but	caught	enemies
ever	catch	dollars	except
farm	caught	except	excite
field	chased	excite	field
for	climb	family	for
game	excite	favorite	ghost
ghost	fairy	finished	girl
hockey	farm	follow	happened
holiday	family	for	happily
jump	fight	ghost	hockey
laugh	finished	girl	holiday
mountain	ghost	happily	horse
of	girl	herd	knock
over	happened	holiday	let's
own	happily	horse	month
picnic	holiday	knock	mountain
skating	horse	let's	motor
sleep	jump	magic	next
stopped	jumped	might	of
taking	knock	missed	other
tricks	laugh	money	picture
tried	let's	month	planets
upon	married	motor	porridge
valentine	mountain	neighbor	started
watch	of	next	stopped
who	other	no	tobaggan
.....	scared	only	tried
.....	second	other	upon
.....	started	porridge	no
.....	station	present	.....
.....	stopped	rifle	.....
.....	suddenly	scared	.....
.....	things	scientist	.....
.....	took	started	.....

Grade II	Grad III	Grade IV	Grade V
.....	tried	stopped	.....
.....	told	suddenly	.....
.....	upon	take	.....
.....	watch	than	.....
.....	water	took	.....
.....	while	treasure	.....
.....	.....	tried	.....
.....	.....	told	.....
.....	.....	upon	.....
.....	.....	watch	.....
.....	.....	while	.....
.....	.....	whose	.....

IV. CONCLUSIONS

On the basis of the observed results, it seems reasonable to conclude that—

1. Canadian girls misspell significantly fewer words in their free writing than do Canadian boys.

2. There is no evidence that there is a true sex difference in the "quality" of the words misspelled in Grades II to V in Canada.

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DIRECTED COGNITION AND PERSONALITY CHANGE[1]

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In general, the theoretical orientation of this study is similar to that of cognitive theorists who regard cognition "as a centrally mediated process of representing external and internal events" (Scheerer, 1954, p. 137) and who believe that some concept of cognitive activity is necessary in order to explain the translation of stimulation into action (Miller, Galanter and Pribram, 1960). It is also in agreement with Rokeach's assertion that it is possible to develop "a single set of concepts, a single language, that is equally appropriate to the analysis of personality, ideology and cognitive behavior" (Rokeach, 1960, p. 7). The theoretical position of the authors can be summarized in the statement: there is a direct, but not necessarily simple, relationship or correspondence between cognitions (thinking) and overt behavior.

Stated in this very general fashion, the theory is hardly sufficient to generate experiment; further articulation is essential. A theoretical model of a possible relationship between thinking and behavior has therefore been devised. This is described in the following paragraph.

If it is legitimate to use such terms as "constriction" and "flexibility" in referring to cognition, then we may say that constriction in thinking will lead to constricted behavior, and flexibility in thinking to flexible behavior. For most persons the source of constriction is the exclusion of certain thoughts from awareness, or, to put it differently, the consistent avoidance of thinking about particular themes. The content of the themes which are avoided determines the areas of behavior where action is restricted. Constriction is not only specific, however. The very fact of purposive exclusion implies a general constriction of behavior, since a person who has to be always on guard against his own thoughts can never bring all his mental resources to bear on his relationships with the environment. He is also liable to develop symptoms of tension, or what is commonly referred to as anxiety; these do not arise from the thoughts themselves, but from the efforts to exclude the thoughts. (Obviously, this hypothesis is the converse of the usual explanation that anxiety causes constricted thinking; it may have something in common with Festingers' theory of cognitive dissonance (Festinger, 1957).)

[1]A version of this paper was read at the 1960 Annual Convention of the Canadian Psychological Association.

For the purposes of experiment it has to be assumed that a person is capable of thinking about excluded themes if directed to do so. If this assumption is correct, then such direction would constitute a technique for the reduction of anxiety.

Having devised a theoretical model, the experimenters formulated the following research hypothesis for experimental testing: that thinking about themes ordinarily excluded from thought will result in personality changes observable on personality inventories and in structured interviews.[2]

Method

Sample

The sample consisted of 42 volunteers, 10 women and 32 men, from undergraduate courses in educational psychology. Individuals were randomly assigned to two experimental groups and one control group. During the treatment phase four subjects dropped out of one of the experimental groups.

Treatment

The experimental groups met for one hour a week over a period of nine weeks. Each experimenter retained the same group throughout the investigation. The first meeting was devoted to explanation of the purposes of the experiment. Succeeding meetings were devoted primarily to clarification of what is meant by thinking about excluded themes. Subjects participated freely in discussion during meetings, asking questions, making comments, relating previous experiences in stressful situations, arguing, and reporting on progress.

At each meeting subjects were given assignments to be completed by the next meeting. A sample of assignments follows:

1. Note thoughts or themes in a stressful situation and deliberately attempt to think about additional or alternative themes.

2. List themes ordinarily not thought about and think about these themes for three twenty-minute periods.

3. Make a list of themes involving disapproval by parents and teachers. Direct thinking to include these themes.

4. Consider two themes, sex and aggression, and think about these themes in a personal, concrete manner.

5. Think about hurting someone you know and consider the response of person being hurt.

[2]It should be noted that, unlike some cognitive theories of psychotherapy (Ellis, 1958; Phillips, 1956), the theory presented in this paper does not assume that personality change is dependent on changes in basic beliefs, values, or expectancies. The emphasis throughout is on the exclusion or avoidance of themes in thinking, not on their content.

6. Think in a personal, concrete manner about receiving sympathy from someone you know.

Measurement of Personality Change

Three instruments, Minnesota Multiphasic Personality Inventory, Design Preference Inventory,[3] and Texture Preference Inventory,[4] were administered to all subjects before meeting in groups and after the nine meetings had ended. Algebraic differences between pre- and post-test scores were used throughout the analyses.

TABLE I

MEANS AND VARIANCES OF DIFFERENCES BETWEEN PRE- AND POST-SCORES ON THE MMPI FOR EXPERIMENTAL AND CONTROL GROUPS

MMPI	Experimental and Control Groups					
	Exp.—A	(N=10)	Exp.—B	(N=14)	Cont.—C	(N=14)
	$\overline{X}$	S^2	$\overline{X}$	S^2	$\overline{X}$	S^2
L	.1	1.0	1.0	2.8	– .5	3.3
F	.5*	4.5	.3*	3.1	–1.4*	3.2
K	– .3	12.6	.1	17.3	1.1	15.2
H_s	–1.4	9.6	–1.6	14.9	–1.4	7.0
D	1.0	12.9	–1.2	12.5	–1.3	15.7
H_y	.5	13.2	– .6	23.3	–2.2	17.7
P_d	1.1	13.9	– .9	13.9	– .4	14.2
M_f	–1.6	10.0	– .6	9.8	1.3	7.9
P_a	–1.0	11.6**	– .3	15.1**	– .6	2.7**
P_t	0.0	29.0	–3.0	38.5	–2.6	14.1
S_c	1.4	27.4	–1.3	39.0	–1.9	17.3
M_a	– .9	5.9	– .4	4.9	– .1	15.0
S_i	– .5	24.7	–1.3	17.5	–4.3	22.8

*Significantly different at .05 level.
**Significantly different at .05 level.

[3]The Design Preference Inventory consists of 256 pairs of non-representative designs representing 32 clusters or types of designs. Subjects are asked to indicate preference between members of a pair. A score showing consistent preference or lack of preference is obtained for each cluster.

[4]The texture Preference Inventory consists of 144 pairs of photographs of textures; 12 clusters are represented. It is administered and scored in the same way as the Design Preference Inventory.
Both instrumnts have been developed by one of the authors.

Upon completion of the treatment phase, half-hour semi-structured interviews were held with all subjects in the experimental groups. Four general areas were covered: (1) description of any changes in behavior (2) general raction to the experiment (3) opinion of how others would react to the experiment, and (4) suggestions for improvement of techniques.

Results

Changes on the MMPI for experimental groups A and B and control group C are given in Table I. Using analysis of variance and Bartlett's test of homogeneity of variance, two significant results were obtained. Mean changes on the F scale were significant at the five per cent level and the variances on the P_a scale differed significantly at the five per cent level. Variances on the P_t, C_c, and M_a scales differ somewhat but are not statistically significant. (However, the number of cases is small and a large difference is required to yield statistical significance). Note that the variances were greater for the experimental groups on the P_a, P_t, and S_c scales whereas the variance was greater for the control group on the M_a scale.

The twelve Texture Preference Inventory scales yielded two significant results. Mean changes differed significantly at the one per cent level and five per cent level on two scales. Mean changes for experimental group A were almost identical with control group changes whereas experimental group B mean changes differed from those of the other two groups. None of the variances were significantly different.

None of the means, again based on differences between pre- and post-tests, were significantly different on the 32 scales of the Design Preference Inventory. One set of variances differed significantly at the one per cent level and three differed significantly at the five per cent level. Variances, with one exception, were greater for the control group than for the experimental groups.

Semi-structured interviews provided supplementary information on behavioral changes, reaction to the experiment, opinion of reaction of others to such an experiment, and more effective techniques. Only Ss in the experimental groups were interviewed.

Approximately one half of the Ss in experimental groups reported that no change had taken place in their behavior or they were unable to give specific examples. Two Ss convincingly indicated that they had been thinking freely for years about most of the themes considered. Ss who reported no change gave evidence either that they did not understand the experimental treatment or that they had been reluctant to try the kind of "directed" thinking suggested.

The Ss who reported definite behavioral changes freely gave specific examples such as: "I discuss things rather than lay down the law to my daughter;" "I talk more to strangers;" "If I want to do something, I do it rather than yield to social pressures and trying to please;" "Less trying to please my wife without being nasty;" "Join more informal groups and participate in the conversation;" "Talk more to others;" "Better able to organize work and accomplish something;" "Work mathematical problems without becoming tense;" "Less rankled by roommate."

All of the Ss reported that they liked the experiment and were glad that they had participated. Almost all thought that other people would respond favorably to this kind of experiment. A few had minor reservations about possible conflict with the strongly-held beliefs of minority groups.

Most of the suggestions for improving techniques concerned an increased directiveness on the part of the experimenters. This perhaps reflects the difficulty the Ss had in directing their thinking to themes they had been avoiding. A sample of the suggestions follows:

1. Make sure people do assignments.
2. Assign rooms for meeting during the week to carry out assignments.
3. Create stressful situations.
4. Write out assignments and responses to assignments.
5. Assignments should be more specific.
6. Have people meet to do thinking.
7. Put more emphasis on positive themes.
8. Encourage people to shift their attention away from internal sensations.

Discussion

The results obtained in this experiment appear to support the hypothesis that thinking about themes ordinarily excluded from thought will produce observable changes in personality, although the possibility should not be overlooked that the meetings and general discussions were more influential than the specific instructions given to subjects.

It will be evident from Table I that the changes obtained are not capable of simple interpretation. There is a strong tendency for the experimental groups to become more variable on certain personality measures, while retaining approximately the same mean scores. Two individuals in one group did show marked changes both in

personality score and observed behavior, and clearly responded well to the experiment. Inconveniently enough, however, MMPI scores decreased in the one case and increased in the other. It is, of course, plausible to suppose that in an experiment designed to produce greater cognitive flexibility more variable than systematic changes should take place.

The experiment was intended as a preliminary test on an hypothesis purposely stated in a very general way. Although the results do not show systematic trends, they are sufficiently interesting to justify further investigations. Part of the reason for their relative incoherence, however, may be the lack of articulation of the underlying theory. This suggests the necessity of theoretical clarification before further experimental work is designed. It should be clear that the original theory tentatively devised by the experimenters takes into account only one of the several possible relevant relationships between cognition and behavior. In addition to being logically conceivable, this relationship seems psychologically probable. Other relationships, equally conceivable, are evidentially in a poorer initial position. What is now needed is a theoretical framework for an experiment which is inclusive enough to cover all the major possibilities, and specific enough to produce testable hypotheses. The experimenters are at present working on this project.

Summary

In an attempt to determine the effect of directed thinking on personality as measured by structured inventories and interviews two experimental groups participated in nine weekly one hour sessions to discuss and report work on themes ordinarily excluded from thinking. Pre- and post-session measures were obtained with the MMPI, a Texture Preference Inventory and a Design Preference Inventory. A comparison of the experimental groups with a control group yielded significant changes on the F and Pa scales of the MMPI. Two significant changes were also noted on the Texture Preference Inventory. The Design Preference Inventory yielded no significant changes. Post-experimental interviews with members of the experimental groups indicated that about half of the Ss were aware of some behavioral change as a result of the experiment. Results are interpreted as supporting the conclusion that directed thinking about excluded themes produces changes in personality.

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THE SYSTEMATIC DEVELOPMENT OF A PROBLEM OF EXTRACURRICULAR ACTIVITIES IN SCIENCE

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The Problem

Wherever there is a curriculum there are likely to be found some extensions of it which may be called extracurricular activities. Such activities arising from the study of science in Alberta high schools vary considerably in quantity, kind, and quality. Although there are many important decisions to be made by teachers who guide such activities, it is often difficult to find sound bases upon which to make many of these decisions. The problem of this investigation was to systematically develop an optimum program of extracurricular activities for the Strathcona Composite High School Science Club.

As sponsor of this newly organized science club, the senior writer was in a position to influence the establishment of its objectives, to put forth efforts to determine the extent of achievement of these objectives, and to utilize findings in a continuous process of evaluation and redirection of activity (6).

Studies summarized by Hansen and Terry in the *Encyclopedia of Educational Research* strongly emphasize the need for systematic development and objective evaluation of extracurricular activities (3). A recent study of extracurricular programs of composite high schools in Alberta makes the following its most urgent recommendation:

> Administrators need to take time to analyze exactly what they are attempting to do in the field of extracurricular activities. Objectives must be formulated; planning, coordinating, organizing, directing—all the aspects of sound administration need to be implemented in setting up the structure in which the program will work; and the efforts so expended must periodically be gauged to determine how successfully the aims are being realized. Until a school staff has a clear conception of where it is going, it can never determine whether the goal has been reached. The move toward analysis of values which could accrue from extracurricular activities, the formulation of objectives, the evaluation of progress—these seem to be basic steps which may lead the composite high schools' retreat from haphazardness in this field of administration. (5).

Plan for the Study

The plan for the development of the extracurricular program was based on the following five steps, which were not entirely sequential.

A. Establish objectives for the science club program.
B. List all extracurricular activities of possible value to the science club.
C. Use the objectives as criteria in the selection of activities to be promoted.
D. Promote the selected activities during one year of science club operation.
E. Make a final evaluation of the objectives and activities.

The concept of evaluation as cooperative, making use of contributions from all those involved in the activity, as comprehensive, in covering all parts of the program; and as continuous, giving guidance to operation at all times, became fundamental to the study (7).

Objectives of the Extracurricular Program in Science

The objectives of the program of extracurricular activities were given much attention because they were required to serve as bases for planning activities and for evaluation. Study of the literature on the subject and examination of applicable guides led to adoption of the following six items as sources from which to derive objectives: objectives of the Alberta High School Curriculum (9), objectives of secondary school science programs (1) and (8), objectives of extracurricular activities (2), the needs of members of the science club, local resources, and psychological principles.

A list of objectives of secondary school science programs was compiled mainly from Richardson's *Science Teaching in Secondary Schools* and *Forty-sixth Yearbook* of the National Society for the Study of Education. This list of objectives was greatly modified by taking into account each of the other five items above selected to serve as guides.

The following list of objectives for the Science Club was the final result of the process:

Improved scholarship in science

1. Increased knowledge of scientific facts and principles.
2. Increased knowledge of scientific vocations.
3. Increased familiarity with scientific method.
4. Increased laboratory skills.
5. Increased desire for scholastic achievement.
6. Increased resourcefulness.
7. Increased tendency to search for truth with an open mind.

Increased interest in science

8. Increased interest in reading material in the field of science.

9. Increased interest in science as a vocational field.
10. Increased interest in recreational activities related to science.
11. Increased tendency to associate with others with science interest.
12. Broadening of interests to more areas of science.

Service to others

13. By provision of educational materials and activities.
14. By attention to matters relating to conservation of resources.

These objectives remained unchanged throughout the school year but were modified at year-end in the light of findings.

Selection and Promotion of Activities

Planning activities

A list was compiled of every promising activity found in the literature on science clubs and science enrichment programs (11 to 20). This list was investigated item by item in order to select those activities which seemed most suitable for the program at Strathcona Composite High School during the school year 1959-60. The following twenty-seven items were retained for consideration: collections of scientific interest, photography of scientific interest, construction and testing of science club equipment, research (largely investigation of local conditions), trips to industrial plants and laboratories, trips to libraries, participation in projects at the Research Council of Alberta, trips for nature study, trips to the University of Alberta, observing other members at work on projects, viewing films, reading resulting from science club activity, participation in or listening to debates and discussion on chosen topics,hearing reports on adult science organizations, hearing special reports on the activities of club members, hearing visiting speakers, psychological testing, mathematical games, solving puzzles and problems, business and organization meetings, preparing and giving demonstrations, work on displays and exhibitions, selecting and showing films, improvement of school laboratory equipment, acting as laboratory assistant, providing leadership and assistance for groups of nonmembers, and maintaining a bulletin board and reading shelf.

A tentative plan was made for each of the above activities in order to more completely visualize its probable outcomes. Using a two-way table, the sponsor appraised expected educational outcomes for each of the twenty-seven activities in terms of each of the fourteen objectives that had been established. The total contribution expected from each activity was used as a basis for determining the desirability of its promotion.

Difficulty of administration, evaluated in terms of financial cost, supervision required, physical danger involved, interference with other school work, and value of physical product, were also determined for each of the twenty-seven activities and were used in the process of selection of activities.

Policies followed

Drawing from the literature on the subject and from his experience the science club sponsor formed the following policies which were generally adhered to during the year of activity:

1. The already existent policy of starting small with provision for growing large was to be continued.
2. A record was to be kept of all activities.
3. The school and community were to be kept well informed as to what was going on in the club.
4. Operation was to be as democratic as was practicable with increasing democracy as the members gained experience.
5. Membership was to be open to all Grade XI and XII students but restricted at the Grade X level to honor students only.
6. The science club program was to be one of enrichment and extension beyond work done in regular classes.
7. Individuals were to be treated as though they were for the most part self motivated, not requiring compulsion in order to get things done.
8. Students were not to be taken out of classes in order to carry on science club activity.
9. Club activities were to be planned so as to avoid interference with homework.

Activities carried on

It will be observed that the list of activities carried out does not correspond to the list of activities proposed above. The reason for this is that the list of twenty-seven items was found to be too long and detailed to serve as a basis for evaluation where the judgments of students were required upon each activity. Activities carried on were reclassified under the nine headings which accompany the brief descriptions below.

Projects. Eight student projects developed with varying degrees of success. Projects of individuals and very small groups were most outstanding.

Field trips. Field trips were made to the Edmonton Public library, a mineralogy laboratory, and a low temperature laboratory. Each trip was by a small group and for a special purpose.

Films. There were eleven showings averaging 30 minutes each, with an average attendance of about 35 viewers.

Science fair. A science fair was held one evening within the school in conjunction with a tea sponsored by the Home and School Association. Students exhibited projects, showed some regular class work, and set up some thought provoking display pieces.

Reading shelf. A reading shelf consisting of science magazines, free materials from industrial concerns, clippings from current publications, and a few books chosen to stimulate interest in projects was maintained.

Special physics lectures. The writer and six students from Strathcona Composite High School attended a series of ten two-hour physics lectures designed to stimulate the thinking of outstanding high school students.

Research Council educational program. Four outstanding students along with the writer formed a group under the instruction of a prominent scientist at the research Council of Alberta. For fourteen Saturday morning sessions of about two and a half hours each, the group participated in a research project related to some of the scientist's major investigations in physical chemistry.

This activity was part of a program involving about thirty-five gifted high school students in the Edmonton area, seven teachers, and seven scientists from the Research Council of Alberta. A full account of this program may be found elsewhere (4).

Laboratory assistants. Five pupils were selected from sixteen that volunteered to be laboratory assistants. A schedule was drawn up according to which one of the five assistants was to be available each day for the week to help science club members and to maintain equipment used.

Business meetings. Business meetings intended for the whole membership of the club were held every Monday that was a school day from the first of September to the end of May with three exceptions at examination times.

Evaluation Procedures and Findings

Evaluation of Objectives

In connection with year-end interviews of thirty-six pupils who participated in extracurricular activities in science, each pupil was asked to rate for importance each of the fourteen objectives established by the sponsor. Corresponding data were obtained from a group made up of two school administrators, two guidance counsellors, two science department coordinators, and four science teachers

all of whom were acquainted with science activities in composite high schools. This group will be referred to as the teacher's group. Since measurement was only at the ordinal level nonparametric statistics were used to determine the significance of differences between ratings given (10). The median test showed that for no objective was the teachers' median rating significantly different, at the .05 level, from the pupils' median rating.

In order to make comparisons with the sponsor's own estimate of the relative importance of each objective, the median ratings by teachers and by pupils were used to obtain rank orders of their respective ratings of the fourteen objectives. These rank-order results are shown in Table I. The Spearman rank correlation coefficient for teachers' and pupils' ranking was about 0.7, while similar coefficients for the sponsor's ranking with those of teachers and of pupils were about 0.4.

TABLE I

RANKINGS OF THE OBJECTIVES OF THE SCIENCE CLUB ACCORDING TO THEIR IMPORTANCE BY THE SCIENCE CLUB SPONSOR, BY THE TEACHERS, AND BY THE PUPILS

Objective	Ranking by sponsor	Ranking by teachers	Ranking by pupils
1. Facts and principles	4	2	1
2. Vocational information	5	11	11.5
3. Scientific method	1	2	6
4. Laboratory skills	10	9	3
5. Scholastic desire	9	6	7
6. Resourcefulness	11	4	10
7. Open mindedness	2	2	2
8. Reading interest	3	7	5
9. Vocational interest	12	12	11.5
10. Recreational interest	13	14	14
11. Science fellowship	6	10	9
12. Broadening influence	14	5	4
13. Service to nonmembers	7	13	8
14. Conservation consciousness	8	8	13

The sign test indicated that both teachers and pupils rated objective 1 significantly higher than the lowest-rated objective, while both groups rated objectives 2, 9, 10 and 13 significantly lower than the highest-rated objective (.01 level).

Relative Value of Activities

After completion of science club activities for the year 1959-60, the sponsor arranged the nine classes of activities experienced in

rank order according to educational value as directly estimated by him.

Next, a more analytical approach was used in which the sponsor estimated the contribution made by each activity to each of the fourteen objectives. The assumption of approximate equality of importance of the objestives was made and a total educational value for each of the nine activities was determined by adding together the estimated contributions made to each of the fourteen objectives. Table II shows this analysis of values. The totals obtained were used to arrange the nine activities in rank order according to educational value.

TABLE II

SPONSOR'S ANALYSIS OF EDUCATIONAL VALUE OF THE NINE KINDS OF ACTIVITIES CARRIED ON

	Facts and principles	Vocational information	Scientific method	Laboratory skills	Scholastic desire	Resourcefulness	Open mindedness	Reading interest	Vocational interest	Recreational interest	Science fellowship	Broadening influence	Service to nonmembers	Conservation consciousness	Total contribution
1. Projects	3	1	3	3	3	4	2	3	2	0	3	1	2	0	30
2. Field trips	2	1	2	1	3	0	1	2	1	0	1	1	0	0	15
3. Films	3	1	1	1	2	0	2	1	1	1	0	1	4	1	19
4. Science fair	1	0	0	2	3	1	0	1	2	1	2	1	2	0	16
5. Reading shelf	2	2	1	1	2	0	2	3	2	3	1	2	2	1	24
6. Physics lectures	4	2	3	1	3	0	3	3	2	0	3	0	0	1	25
7. R.C.A. program	3	4	4	3	2	2	3	2	1	0	3	1	0	0	28
8. Laboratory assistant	1	1	2	4	0	1	0	1	1	0	2	0	2	0	15
9. Business meetings	0	0	0	0	2	0	1	1	1	0	3	1	4	1	14

0 represents no contribution.
1 represents very little contribution.
2 represents moderate contribution.
3 represents extensive contribution
4 represents very great contribution.

A third rank order arrangement of the activities was derived from information obtained and recorded during the interviews with thirty pupils, each of whom participated in more than one of the activities. Each pupil was asked to arrange in rank order according to educational value those activities in which he had participated.

The sponsor then compared the ranking of each activity with that of each of the other eight activities, to determine which member of each pair should be higher in rank order. The member of the pair placed higher by a majority of pupils was given the higher position of the two. This procedure enabled a fairly clear ranking of the nine activities in terms of pupil estimate of educational value, even though each pupil had not participated in all activities.

Table III shows the results of these three ways of ranking the activities. The projects, the educational program of the Research Council of Alberta, and the special physics lectures appear to have made the greatest contribution to attainment of the objectives of the science club.

TABLE III

RANK ORDERS ACCORDING TO EDUCATIONAL VALUE ASSIGNED TO NINE KINDS OF ACTIVITIES BY SPONSOR'S DIRECT ESTIMATE, BY SPONSOR'S SYSTEMATIC ANALYSIS, AND BY PUPILS WHO PARTICIPATED IN THE ACTIVITIES

Kind of activity	Ranking by sponsor's estimate	Ranking by sponsor's analysis	Ranking by participating pupils
1. Projects	3	1	2
2. Field trips	4	7.5	8
3. Films	7	5	5
4. Science fair	8	6	4
5. Reading shelf	6	4	7
6. Physics lectures	2	3	2
7. R.C.A. program	1	2	2
8. Laboratory assistant	5	7.5	6
9. Business meetings	9	9	9

Spearman's rank correlation coefficient for each combination of rankings above was found to be as follows:

Sponsor's estimate and sponsor's analysis	.70
Sponsor's estimate and pupils' estimate	.67
Sponsor's analysis and pupils' estimate	.85

Evaluation of Program as a Whole and of Particular Activities

Additional judgments were made through partially structured interviews with 32 pupils who had participated extensively in the 1959-60 program of extracurricular activities in science. There was a clear indication that most of those participants remaining in school for the next school year intended to take part in the program to an even greater extent than they had previously. It was also evident

that nearly all those interviewed believed their parents were in favor of their participation in the activities. Individual choices of activities for the coming year showed a preference for projects over all other activities, with the Research Council program also highly favored.

School records indicated that almost all participants had been high in scholastic ability and in achievement, and that they continued to achieve highly during the year of participation in extracurricular activities in science.

A number of special measures were taken to assist in evaluation of particular activities. For example, judgments of the Research Council program were obtained through questionnaires sent to the 24 participating students from high schools of the Edmonton Public School District, through evaluative accounts written by each of the seven instructing scientists, and through interviews with six of the participating teachers. Similar procedures were used in obtaining evidence concerning the evening physics lectures. These opinions were taken into account in planning to continue the activities with some modifications.

Steps taken to check on the validity and reliability of the evaluation instruments used, insofar as circumstances permitted, are outlined elsewhere (6).

Summary and Conclusions

This study sought to develop, through a science club, an optimum program of extracurricular activities in science in an Alberta composite high school. A carefully constructed set of objectives for the club was used to select nine main activities which were carried through during the year 1959-60. Evaluation of both objectives and activities was used to guide the program throughout the year, and to provide bases for modification of the program for the ensuing year. Among the main conclusions reached were these:

1. There was substantial agreement among teachers and pupils with respect to the relative importance of the various objectives of the program, with "Increased knowledge of scientific facts and principles" the most highly ranked objective.
2. There was substantial agreement between sponsor and pupils with respect to the relative educational value of the various activities, with projects, the educational program of the Research Council of Alberta, and a series of special physics lectures ranking most highly in this connection.
3. The basic hypothesis that a carefully planned program of

extracurricular activities in science for pupils of this school would have sufficient educational value to warrant its continuation was substantiated. Thirteen specific recommendations were made concerning the operation of this particular program in the ensuing year.

General Recommendations

In addition, the following general recommendations arise from the experience of this study:

1. Two distinct kinds of investigations should be carried on in order to extend knowledge concerning extracurricular activities in science.

Some investigations, following the lines of this study, should be long continuing developmental processes conducted by teachers on-the-job and guided by the best sources of information and evaluation procedures practicable in such situations.

Other research, based on properly established goals, should use more rigorous methods to gain substantial evidence regarding the value of particular extracurricular activities in science.

2. The development of extracurricular activities in science should remain firmly under the control of school authorities in order to facilitate growth of properly integrated programs.

3. In order to secure enthusiastic leadership for activities in science, all teacher participation should be on a voluntary basis with possible recognition for time and effort expended.

4. Since development of a good activity to suit local conditions is often a slow process requiring much investigation, provision should be made for communication of experience among neighboring high school science clubs.

5. The policy of starting activity in a science club on a small scale and expanding it in the light of experience gained is strongly recommended.

6. Science club sponsors should seek to develop balanced programs consisting of a variety of activities and should not allow the life of the club to become dependent on one activity or project.

7. The objectives established, the evaluation procedures used, and the activities discussed in this study are recommended for consideration by science club sponsors seeking to develop programs of extracurricular activities in science.

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THE ASSISTANT PRINCIPAL OF URBAN ELEMENTARY AND ELEMENTARY-JUNIOR HIGH SCHOOLS

J. Douglas McLeod and John H. M. Andrews

One method of learning about what is happening in education is to study what educators are doing in their various fields. Through close observation of the active participants, opportunities appear for discovering educational trends that might otherwise go unnoticed. In particular, studies of the responsibilities of personnel in administrative and supervisory positions have this value. One of the more humble members in the hierarchy of educational administration is the assistant principal. Yet his is an important position, since it is often the launching base for those moving toward more advanced educational posts. It is a significant position to study also because there has appeared to be little agreement as to what function he might perform to be of maximum use in the school.

The assistant principal studied in this research is the person next in authority to the principal. He is employed in the public elementary and elementary-junior high schools of Edmonton, Calgary, and Lethbridge.

Problem and Methodology

The main purpose of the study was to determine the administrative functions and duties performed by the urban assistant principal and to compare his present duties with those expected of him. Included in the study was a review of the working situation and the personal background of the assistant principal.

Information for the investigation was gathered from a questionnaire completed by the principals and assistant principals of large Alberta urban centers. Data regarding personal and professional background were obtained from assistants only. Part I of the questionnaire contained a list of sixty-six duties that assistant principals might be expected to perform. Respondents could check the degree of responsibility they had for each duty and estimate the time spent on it each day. Responses indicated duties assistant principals have and responsibilities that they thought they should have. Part II of the questionnaire assessed the working situation of the assistant principal. He was asked for information about his status, the administrative time allowed him, the inservice training, and the problems he was meeting.

In the analysis, a comparison was made between the actual

duties of the assistant principal and the duties expected of him. Only those differences which were significant at the 0.1 level of confidence were noted.

Responses of principals and assistant principals were then compared to determine areas of conflict with regard to their expectations for the job of the assistant principal.

Findings

Findings were reported in five different categories referring respectively to small elementary schools, large elementary schools, small elementary-junior high schools, and large elementary-junior high schools. The fifth category comprised general findings.

Small elementary schools.

Assistant principals of small elementary schools were credited with a major share of responsibility in taking charge of the school in the principal's absence and providing liaison between the principal and staff. It was felt that assistant principals should have an additional major responsibility in planning the extracurricular activities for the school.

Duties to which principals and assistant principals attached most significance and which required most of the assistant's time and attention were: controlling pupils outside classrooms, planning extracurricular activities, developing school philosophy and policies, dealing with pupils sent for disciplining, and collecting money.

There were forty-five duties for which assistant principals had some responsibility, and there were others which they thought should be included. Most of these additional duties related to supervision and the instructional program.

Assistant principals of small elementary schools had no time scheduled for administrative duties but considered that they should have 3.3 hours per week free from teaching. Half the assistant principals in this group felt their status to be about the same as classroom teachers and very few of them looked upon themselves as coordinates with the principal. Their individual responsibilities were few, and most of them thought that their share of responsibility in the administration of the school was small.

Two-thirds of the assistant principals rated their jobs as good preparation for greater educational responsibility.

Large elementary schools.

The major responsibilities assumed by assistant principals of large elementary schools were taking charge of the school in the principal's absence, managing the supply room and controlling

pupils outside classrooms. They though they should have in addition a major share of responsibility in looking after textbook rental and distribution, acting as liaison between the principal and staff and allocating playgrounds.

Assistant principals, however, had some share of responsibility in thirty-three other duties. Principals and assistant principals both indicated that the latter should take responsibility in supervising the instructional program. Very little of this responsibility was found to exist in present practice.

Duties to which principals and assistant principals attached most significance and which required most of the assistants' attention and time were: taking charge of the school in the principal's absence, controlling pupils outside classrooms, managing the supply room, acting as liaison between the principal and staff and dealing with pupils sent for disciplining.

Assistant principals of large elementary schools had 1.2 hours per week scheduled for administrative duties but wanted this increased to 5.5 hours a week.

Assistant principals of large elementary schools associated more status with their positions than did those of small elementary schools.

Most of the assistant principals thought the assistant principalship provided good or excellent training for the principalship.

Small elementary-junior high schools.

Assistant principals in this group had a major share of responsibility in more duties than elementary assistants did. They also spent more time on their duties. Major responsibilities included: managing the supply room, taking charge of the school in the principal's absence, looking after textbook distribution, requisitioning and ordering school supplies, controlling pupils outside classrooms and allocating playground space.

Assistant principals of small elementary-junior high schools had 3.5 hours a week of scheduled administrative time but considered they needed eight hours a week to carry out their responsibilities. It was proposed that assistants should undertake more duties, particularly in the area of the instructional program.

About three-quarters of the group rated their job as good or excellent as an opportunity for administrative training.

Large elementary-junior high schools.

The major responsibilities allocated to assistant principals of large elementary-junior high schools were taking charge of the school in the principal's absence and allocating playgrounds. It was thought that they should have a major share of responsibility in

these duties and in addition, in organizing the traffic safety patrol and acting as liaison between the principal and the staff.

Duties to which principals and assistant principals attached most significance and which required most of the assistant's time and attention were: controlling pupils outside classrooms, dealing with pupils sent for disciplining, counselling pupils, developing school philosophy and policies, helping with teacher discipline problems, planning extraccuricular activities, acting as liaison between the principal and staff and conferring with parents about pupils. Assistant principals were expected to do more than they presently do in arranging for teachers to observe lessons, teaching demonstration lessons, observing teachers in classrooms and reporting on teachers' work. More responsibility in preparing school timetables and looking after lockers was also advocated.

Assistant principals of this group had five hours a week scheduled for administrative duties and it was proposed that this time be more than doubled.

This group of assistant principals considered they had a large share of responsibility in the administration of the school. Most of the assistants were satisfied that the assistant principalship offered excellent experience for greater administrative responsibility.

General Findings

The major responsibilities assumed by assistant principals in general were: taking charge of the school in the principal's absence, managing the supply room and allocating playground space. It was felt that assistant principals should have a major share of responsibility in these duties and in addition assume a major responsibility in organizing the traffic safety patrol, looking after textbook rental and distribution and acting as liaison between the principal and staff.

Duties to which principals and assistant principals attached most significance and which required most of the assistant principal's time and attention were: taking charge of the school in the absence of the principal, controlling pupils outside classrooms, developing school philosophy and policies, managing the supply room, dealing with pupils sent for disciplining, and planning extracurricular activities.

Assistant principals had some responsibility for forty-six duties. It was proposed that they should have more responsibility for sixteen of these, and should share the responsibility for fifteen additional ones.

Conflicts between principals and assistant principals concerning the duties of assistant principals were very few.

Ninety-four per cent of thirty-one principals and 74 per cent of forty-four assistant principals thought the principal should be consulted in selecting the assistant principal for the school.

In university training assistant principals of large elementary-junior high schools ranked highest, and assistants of small elementary schools lowest. Of the total group, 68.3 per cent had degrees at the B.A. level, and 12.2 per cent held master's degrees.

Out of forty assistant principals reporting, 72.5 per cent were married men, 25 per cent single women, and 2.5 per cent were single men.

Assistant principals and principals reported that there were several problems facing assistant principals. Most frequently mentioned was that they were not allowed sufficient time to learn about, and to carry out, their administrative responsibilities. Secondly, it was generally reported that the duties of the assistant principal were not clearly understood by either party. In part this might account for some of the overlapping of duties performed by principals and their assistants.

Principals and assistant principals recommended that the assistant should have more time scheduled for administrative duties.

Principals and assistant principals agreed that conferences between the principal and assistant principal were not only the most frequently practised but also the most valuable kind of administrative training assistants received in their school systems. Of all the assistant principals 34.3 per cent rated their duties as excellent administrative training, while 44.7 per cent said the training experience was good.

Few assistant principals and fewer principals reported that principals actually participated in selecting the assistants.

Conclusions

A review of the findings in general revealed a great similarity in the duties and working situations for all categories of assistant principals. There was no clear indication that a specific set of duties could be indentified with any one group.

Assistant principals had very few duties for which they claimed a major responsibility. On the other hand, they shared responsibility in a great many duties. This suggests that assistant principals generally had the function of strengthening and supporting the principals rather than having specific duties of their own.

Some detailed conclusions follow:

1. In many schools the duties of the assistant principal are not clearly defined.

2. Principals and assistant principals as groups are in close agreement in their expectations of the assistant principal's duties.
3. Although a great deal is expected of the assistant principal, he has a heavy teaching load and little scheduled time to perform administrative duties.
4. Principals and assistant principals alike would give the assistant principal more responsibility in the instructional program of the school.
5. Principals are largely responsible for the administrative training of their assistants.
6. Principals do not participate in selecting their assistants although they consider it desirable to do so.
7. Most principals and assistant principals regard assistants principals as less than co-ordinate workers with the principal.

Recommendations

The following recommendations were made from the study completed.

1. A prerequisite to defining the duties of the assistant principal is a definition of the principalship.
2. There is a need for a clear definition of the function and duties of the assistant principal. This definition should have flexibility to allow for individual school situations, but once determined it should be understood by the principal, the assistant principal and the school staff.
3. Assistant principals should have more time free from teaching, provided that their administrative duties are clearly understood and defined.
4. Assistant principals could be of more help to elementary teachers if they had an adequate, up-to-date background in elementary education.
5. Since principals are responsible for most of the in-service administrative training of assistant principals, the central office might give principals some guidance and assistance in this training.

This study has shown that assistant principals are not accepting much responsibility in the planning and supervision of instruction. However, some principals have begun to delegate supervisory responsibility in a small way. The question raised is if this does not constitute sound procedure in itself and at the same time serve to improve the status of the vice-principalship.

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MATHEMATICS PREPARATION OF PROSPECTIVE ELEMENTARY TEACHERS

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In an earlier report (2) it was indicated that the mathematical competence of prospective elementary teachers in Alberta when compared with that of similar groups in the United States was, on the average, relatively high. Attention was also drawn to the rather obvious, but often neglected, fact that competence in mathematics varies directly with the amount of experience in mathematics. It was noted, however, that at the present time students in the degree program in elementary education offered at the University of Alberta devote less time to the study of mathematics than to any other subject commonly taught in the elementary school. There is no required study of the basic content of mathematics since it is apparently assumed that students preparing to be elementary teachers enter the program from high school with sufficient knowledge of mathematics to become effective teachers of mathematics. Little information was provided, however, about the extent to which teacher competence in mathematics was influenced by the *one* experience in mathematics which the program provides—namely a half-year course in methods of teaching mathematics in the elementary school. Nor was there any indication that the mathematics preparation provided by the high school was in any way related to the kind of competence required for teaching the elementary school mathematics program. The present study was undertaken with a view to securing such information.

Purpose of the Study

1. To ascertain the effect of a course in the teaching of mathematics in the elementary school upon the achievement level of prospective elementary teachers in the mathematical processes commonly taught in Grade I to VI.

2. To determine the effect of this course upon the understanding of prospective elementary teachers of the mathematical concepts underlying these processes.

3. To discover the relationship between achievement in a course in the teaching of mathematics in the elementary school and other measures of mathematical competence.

Method

Subjects

The subjects of this investigation were 144 prospective elementary teachers enrolled in the one-year Junior Elementary program in the Faculty of Education at the University of Alberta during the 1959-60 term.

Measures of Mathematical Competence

The Phillips Achievement Test in Elementary Arithmetic (4) was used to measure facility in mathematical processes. Understanding of the mathematical concepts underlying these processes was measured by Glennon's Test of Basic Mathematical Understanding (1). The mark obtaind on the Grade XII departmental examination in Mathematics 30 was used as a measure of the mathematical preparation provided by the high school, while the final grade in Education 227, a half-year course in methods of teaching elementary mathematics, served as a criterion measure of mathematical competence.

Data Collection

The Phillips and Glennon Tests were administered at the time of registration in September and again late in March following completion of the method course. Marks in Mathematics 30 and Education 227 were taken from official university records.

Findings

The gain score in mathematical facility after a course in the teaching of mathematics in the elementary school is indicated in Table I. Although a statistically significant gain was registered by

TABLE I

OBSERVED GAIN IN MATHEMATICAL FACILITY AFTER A COURSE IN THE TEACHING OF MATHEMATICS IN THE ELEMENTARY SCHOOL

	Pre-Test	Post-Test	Gain	$t_{obs.}$
Mean	32.10	33.90	1.80	5.40*
Standard Deviation	5.42	4.20	4.00	.....

*Significant beyond the .01 level.

the group as a whole, considerable individual variation was observed. In fact, a few students actually scored lower after the course than before.

As is shown in Table II a statistically significant gain in the

understanding of mathematical concepts was observed following the methods course. Again considerable individual variation existed, but most students scored higher after the course than before.

TABLE II

OBSERVED GAIN IN UNDERSTANDING OF MATHEMATICAL CONCEPTS AFTER A COURSE IN THE TEACHING OF MATHEMATICS IN THE ELEMENTARY SCHOOL

	Pre-Test	Post-Test	Gain	$t_{obs.}$
Mean	56.92	62.47	5.55	12.47*
Standard Deviation	8.46	7.38	5.34	.....

*Significant beyond the .01 level.

TABLE III

CORRELATION BETWEEN VARIOUS MEASURES OF MATHEMATICAL COMPETENCE

	Mathematics 30	Glennon Pre-Test	Phillips Pre-Test
Education 227	$r = +0.046$	$r = +0.255$*	$r = +0.448$*
Mathematics 30	.....	$r = +0.260$*	$r = +0.359$*

*Significant beyond the .01 level.

TABLE IV

COEFFICIENTS OF ALIENATION (k) AND DEPENDABILITY (E) FOR PREDICTING GRADES IN EDUCATION 227 FROM OTHER MEASURES

	r	$\frac{k}{(\sqrt{1-r^2})}$	$\frac{E}{(1-\sqrt{1-r^2})}$
Education 277—Mathematics 30	+0.046	0.999	0.001
Education 227—Glennon Pre-Test	+0.255	0.967	0.033
Education 227—Phillips Pre-Test	+0.488	0.894	0.106

The relationships among the various measures of mathematical competence are indicated in Table III. Statistically significant correlations were observed between final grades in Education 227 and scores on both the Glennon and Phillips pre-tests. Similarly, marks in Mathematics 30 correlated significantly with scores on the

Phillips and Glennon pre-tests. However, no significant correlation was found between final grades in Education 227 and marks in Mathematics 30.

The efficacy of the various measures for predicting final grades in Education 227 is revealed in Table IV. The small E values, or conversely the large k values, indicate that estimates of final grades in Education 227 from scores in Mathematics 30, or the Glennon Test, or the Phillips Test would be subject to considerable error.

Discussion

The findings of this study indicate that facility in the computational processes commonly taught in Grade I to VI, and understanding of the mathematical concepts underlying these processes, are significantly improved by a half-year course in the teaching of mathematics in the elementary school. For reasons similar to those noted previously (2), these findings cannot be interpreted as meaning that prospective elementary teachers in Alberta have necessarily achieved a desirable or undesirable level of competence in the field of mathematics. The answer to this kind of question lies outside the province of this study. The best that can be said is that the experience in mathmatics presently provided for prospective elementary teachers does raise their level of mathematical competence as measured by the Phillips and Glennon Tests.

The low correlation between marks in Mathematics 30 and final grades in Education 227 is difficult to explain. Had an attempt been made to partial out intelligence one might have expected to find a relatively higher degree of correlation. The low correlation may reflect inadequacies in the statistical analysis, or differences in the way in which attainment in the two courses was measured. It may also be a reflection of differences in the mathematical components of the two courses. Obviously, further research is needed to clarify the nature of the relationship which exists between a student's performance in Mathematics 30 and Education 227.

It is interesting to note that a methods courses leads to gains in content. Methods courses are not designed primarily for this purpose. In large measure, content mastery is usually presumed to be the outcome of other courses in the teacher education program. The fact that content gains may occur as a result of methods courses suggests an argument in favor of such courses seldom used by educators.

Implications

If the quality of mathematics instruction, and hence the level of pupil achievement, depends to some degree upon the mathematical competence of the teacher, then the findings of this study, and those

reported previously (2), have at least one implication for teacher education at the elementary level. The implication is simply this—to improve teacher competence in mathematics devote more time to the study of mathematics.

If this were done, what kind of additional preparation might be desirable? The professional literature offers many suggestions (3), (5), (6), (7). A common thread running through these suggestions is the emphasis upon the need to develop a type of course seldom included in the offerings of either faculties of education or department of mathematics. Such a course should be specifically designed to provide some of the mathematical background so urgently needed by teachers of mathematics in the elementary school. It should "deal with the historical development of systems of numeration, the evolution of the number concept, the role of postulates and definitions in mathematics, generalization, abstraction, and formalism, the nature of mathematical proof, intuitive set theory, symbols, realtions, and operations, the logical basis of the number system, measurement, approximations, variables and functions, statistical concepts." (7)

In short, an attempt should be made in such a course to give some insight into the nature and structure of mathematics. Those persons interested in the mathematics preparation of prospective elementary teachers in Alberta might well ponder the need for a similar course in our own program.

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